Cisco 4000 Series

This chapter provides information on the Cisco 4000 series routers. The information is organized into the following sections:

- Product Overview
- Standard Features
- Network Processor Configurations
- Software Options
- Hardware Options

Note Documentation for the Cisco 4000 series is available in two forms: on a CD-ROM called Cisco Connection Documentation, Enterprise Series (formerly called UniverCD) and printed books. You can request a free copy of the documentation CD when you place an order and have the option of subscribing to a CD update service. Installation documentation ships with each chassis, and a configuration note ships with each component ordered. All configuration notes are available on the CD.

You can also access Cisco technical documentation on the World Wide Web URL http://www.cisco.com. For more information, see the chapter "Documentation" at the end of the catalog.

Product Overview

The Cisco 4000 series consists of the Cisco 4000, Cisco 4000-M, Cisco 4500, Cisco 4500-M, Cisco 4700, and Cisco 4700-M routers. Although the Cisco 4000, Cisco 4500, and Cisco 4700 routers are no longer orderable, they are still supported. The Cisco 4000, Cisco 4500, and Cisco 4700 routers have been replaced by the Cisco 4000-M, Cisco 4500-M, and Cisco 4700-M routers.

NEW

Note The Cisco 4700-M includes an additional main-memory option of 64 MB, which significantly increases the routing table sizes needed to support today's larger networks.

The Cisco 4000 series routers run Cisco IOS software, Cisco's industry-leading networking software that provides a variety of feature sets. You can choose a feature set that supports your specific protocol environment. Cisco IOS software assures robust, reliable internetworks by supporting both LAN and WAN protocols, optimizing WAN services, and controlling internetwork access. In addition, Cisco IOS software allows centralized, integrated, and automated installation and management of internetworks.

The Cisco 4000 series routers offer Flash EPROM technology as a standard feature. Flash EPROMs enable you to distribute new software releases from a central location. After the software is distributed, the routers can reboot from programs stored in local Flash memory.

All models provide a configurable modular router platform by using network processor modules (NPMs)—individual removable cards used for external network connections. Because the router's modules support many variations of protocols, line speeds, and transmission media, the Cisco 4000 series can accommodate all types of network computing environments. As Cisco introduces new modules, the Cisco 4000 series can be upgraded to keep pace with technological advances. The Cisco 4000 series routers can support combinations of up to three of the following NPMs:

- One-, two-, or six-port Ethernet

- One- or two-port Token Ring

- One-port multimode FDDI (both single and dual attachment station [DAS])

- One-port single-mode FDDI (DAS)

- Two- or four-port synchronous serial

- Four- or eight-port ISDN BRI

- One-port channelized T1/ISDN PRI

- One-port channelized E1/ISDN PRI (balanced or unbalanced)

- Four-port serial G.703 (balanced or unbalanced)

- One-port ATM (single-mode or multimode) OC-3c

- One-port ATM DS-3

- One-port ATM E3

Note   See "Network Processor Configurations," later in this chapter, for the maximum number of each type of module and for the minimum Cisco IOS software level for each type of module.
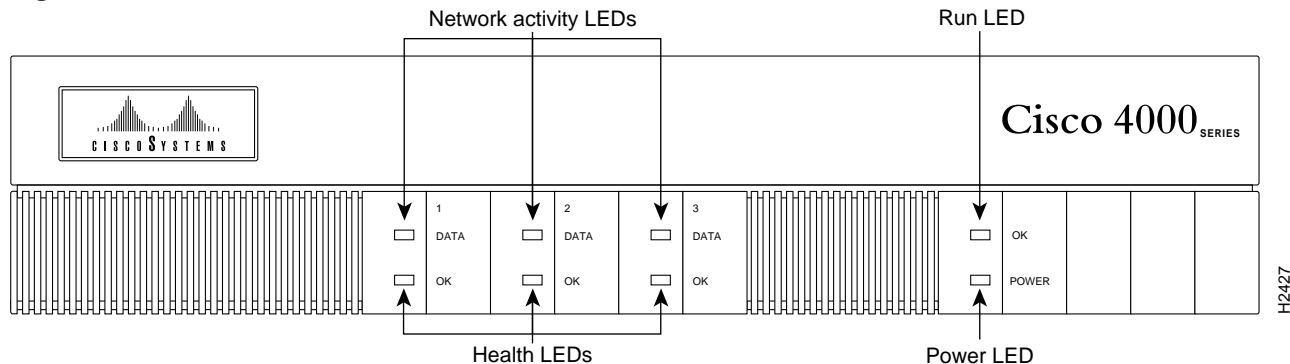
Figure 34   Cisco 4000 Series Front Panel

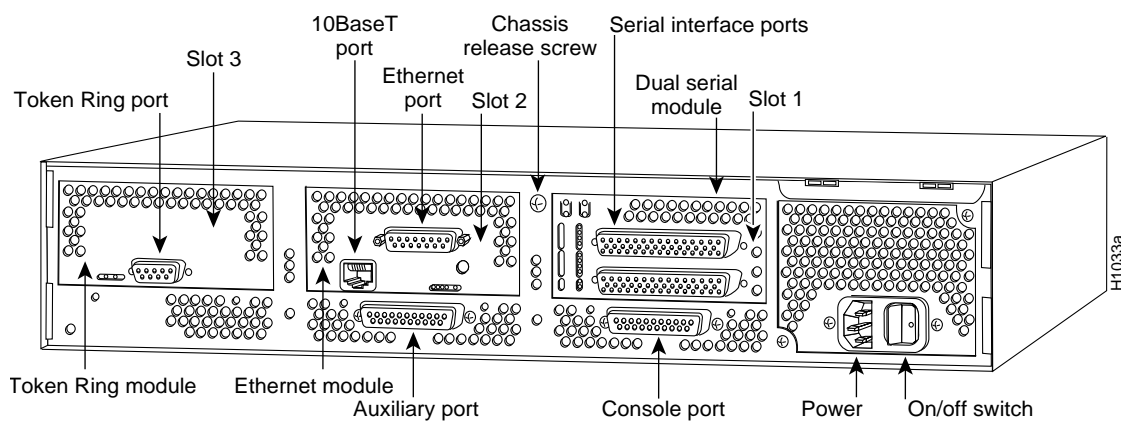**Figure 35   Cisco 4000 Series Rear Panel**

Table 119   Cisco 4000 Series Summary of Features

Characteristic	Cisco 4000-M	Cisco 4500-M	Cisco 4700-M[1]
Supported network interfaces	Ethernet Token Ring FDDI Serial ISDN BRI Channelized E1/T1 ISDN PRI	Ethernet Token Ring FDDI Serial ISDN BRI Channelized E1/T1 ISDN PRI ATM OC-3c ATM DS-3 ATM E3	Ethernet Token Ring FDDI Serial ISDN BRI Channelized E1/T1 ISDN PRI ATM OC-3c ATM DS-3 ATM E3
Slots available for modules	3	3	3

Characteristic	Cisco 4000-M	Cisco 4500-M	Cisco 4700-M[1]
Choice of software feature sets[2]	IP routing IP routing with IBM base functionality[3] IP/IPX routing[3] IP/IPX routing with IBM base functionality[3] IP/IPX/APPN with IBM base functionality[4] Desktop Desktop with IBM base functionality[3] Enterprise [5] Enterprise/APPN[4]	IP routing IP routing with IBM base functionality[3] IP/IPX routing[3] IP/IPX routing with IBM base functionality[3] IP/IPX/APPN with IBM base functionality[4] Desktop Desktop with IBM base functionality [3] Enterprise[5] Enterprise/APPN[4]	IP routing IP routing with IBM base functionality[3] IP/IPX routing[3] IP/IPX routing with IBM base functionality[2] IP/IPX/APPN with IBM base functionality[4] Desktop Desktop with IBM base functionality [3] Enterprise[5] Enterprise/APPN[4]
Processor type	40-MHz 68030	100-MHz IDT Orion RISC	133-MHz IDT Orion RISC
Flash memory	4 MB standard, expandable to 8 MB	4 MB standard, expandable to 8 or 16 MB	4 MB standard, expandable to 8 or 16 MB
Main memory	8 MB standard, expandable to 16 or 32 MB	8 MB standard, expandable to 16 or 32 MB	16 MB standard, expandable to 32 or 64 MB
Shared memory	4 MB[6] standard, expandable to 16 MB	4 MB standard, expandable to 8 or 16 MB	4 MB standard, expandable to 8 or 16 MB
Nonvolatile random-access memory (NVRAM)	128 KB	128 KB	128 KB
Dimensions (H x W x D)	3.4 x 17.6 x 17.7" (8.6 x 44.7 x 43.4 cm)	3.4 x 17.6 x 17.7" (8.6 x 44.7 x 43.4 cm)	3.4 x 17.6 x 17.7" (8.6 x 44.7 x 43.4 cm)
Weight (average shipping)	24 lb (10.9 kg)	24 lb (10.9 kg)	24 lb (10.9 kg)
Agency approvals	UL 1950, CSA 22.2, TÜV-GS mark, EN 60950, FCC Class A, Canadian DOC Class A, VDE Class B, EN 55022 Class B, VCCI Class 2	UL 1950, CSA 22.2, TÜV-GS mark, EN 60950, FCC Class A, Canadian DOC Class A, VDE Class B, EN 55022 Class B, VCCI Class 2	UL 1950, CSA 22.2, TÜV-GS mark, EN 60950, FCC Class A, Canadian DOC Class A, VDE Class B, EN 55022 Class B, VCCI Class 2

1. The Cisco 4700-M includes an additional 64-MB main memory option, which was not available for the Cisco 4700. The new 64-MB option significantly increases the routing table sizes that can be supported in the router.
2. The Cisco 4000-M also supports software in traditional packaging (Cisco IOS Release 10.0.x).
3. This feature set is available with Cisco IOS Release 10.2(2) and later releases.
4. This feature set is available with Cisco IOS Release 11.0 and later releases.
5. Includes IBM base functionality. See the section "Software Options" for more information.
6. Cisco 4000 routers and early versions of Cisco 4000-M routers shipped with 1 MB of standard shared memory. Those systems must be upgraded to 4 MB of shared memory when you install an FDDI interface or have more than five physical or virtual interfaces.

Table 120   Cisco 4000 Series Environmental Specifications

Description	Specification
Consumption	200W (682 Btu/hour)
Input	100 to 240 VAC
Frequency	47 to 63 Hz
Current rating	3.0A @ 100V; 1.5A @ 240V
Operating temperature range	32 to 104 F (0 to 40 C)

Description	Specification
Nonoperating temperature range	–40 to 185 F (–40 to 85 C)
Humidity (noncondensing)	5 to 95%

Standard Features

Cisco 4000 series routers have the following standard features:

- Three slots for NPMs, which can be Ethernet, Token Ring, FDDI, ISDN BRI, ISDN PRI, ATM, or serial network interfaces. See the next section, "Network Processor Configurations," for configuration information.

- 40-MHz 68030 processor (Cisco 4000-M), 100-MHz IDT Orion RISC (Cisco 4500-M), or 133-MHz IDT Orion RISC (Cisco 4700).

- 8 MB (Cisco 4000-M and Cisco 4500-M) or 16 MB (Cisco 4700-M) of expandable RAM.

- 128 KB of NVRAM.

- 4 MB of expandable Flash memory.

- 4 MB of expandable shared memory.

- AC or DC power supply. (The Cisco 4000-M, Cisco 4500-M, and Cisco 4700-M offer both AC and DC power supplies.)

- Power cord and cable.

Network Processor Configurations

Cisco 4000 series routers support combinations of up to three network processor modules (NPMs). Table 121 describes the maximum number of each module supported by a specific system and the minimum Cisco IOS software release required for each module.

Table 121   NPM Configurations—Cisco 4000 Series

Type	Cisco 4000 and Cisco 4000-M	Cisco 4500, Cisco 4500-M, and Cisco 4700-M	Minimum Cisco IOS Software Release Required	Product Numbers
1-port Ethernet	3	–	9.14(1)	NP-1E
2-port Ethernet	3	3	9.14(1)	NP-2E
6-port Ethernet	–	3	10.3(6)	NP-6E
1-port Token Ring	3	3	9.14(5)	NP-1RV2
2-port Token Ring	3	3	9.14(5)	NP-2R
1-port single attachment multimode FDDI	1[1]	2	9.14(1)	NP-1F-S-M
1-port dual attachment multimode FDDI	1[1]	2	9.14(1)	NP-1F-D-MM
1-port dual attachment single-mode FDDI	1[1]	2	9.14(3)	NP-1F-D-SS

Type	Cisco 4000 and Cisco 4000-M	Cisco 4500, Cisco 4500-M, and Cisco 4700-M	Minimum Cisco IOS Software Release Required	Product Numbers
2-port serial	3	3	9.14(6)	NP-2T
4-port serial	3	3	10.1	NP-4T
4-port ISDN BRI	2	2	10.2	NP-4B[2]
8-port ISDN BRI	1	2	10.2	NP-8B[2]
1-port channelized T1/ISDN PRI	1	2	10.3(4)	NP-CT1
1-port channelized E1/ISDN PRI, unbalanced	1	2	10.3(4)	NP-CE1U
1-port channelized E1/ISDN PRI, balanced	1	2	10.3(4)	NP-CE1B
4-port serial E1/G.703, unbalanced	3	3	10.2(4)	NP-4GU
4-port serial E1/G.703, balanced	3	3	10.2(4)	NP-4GB
1-port single-mode ATM OC-3c	–	1	10.3(4)	NP-1A-SM
1-port multimode ATM OC-3c	–	1	10.3(4)	NP-1A-MM
1-port ATM DS-3	–	2	11.0(5)	NP-1A-DS3
1-port ATM E3	–	1	11.0(5)	NP-1A-E3

1. On Cisco 4000-M routers, the FDDI modules do not work on Cisco IOS Release 10.2(2).
2. A maximum of either two NP-4B NPMs or one NP-8B NPM is supported on the Cisco 4000 or Cisco 4000-M routers.

Figure 36 through Figure 53 show the Cisco 4000 series NPMs.
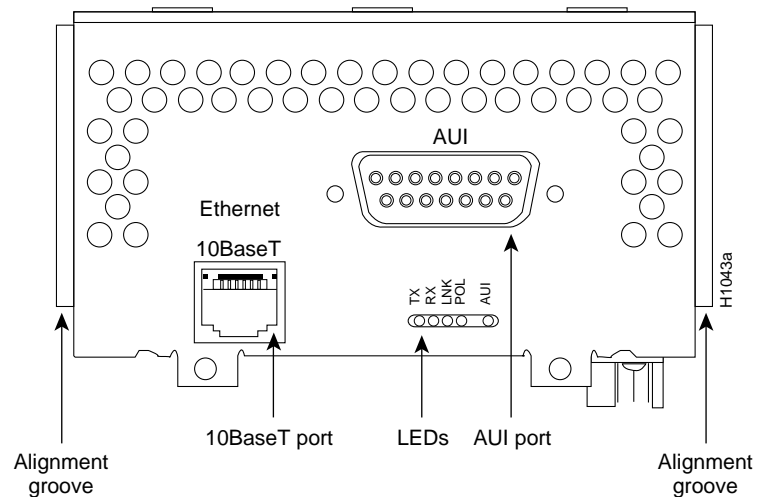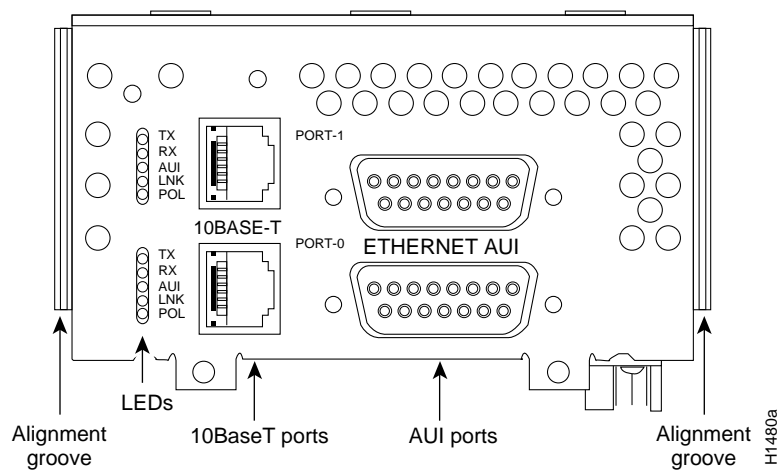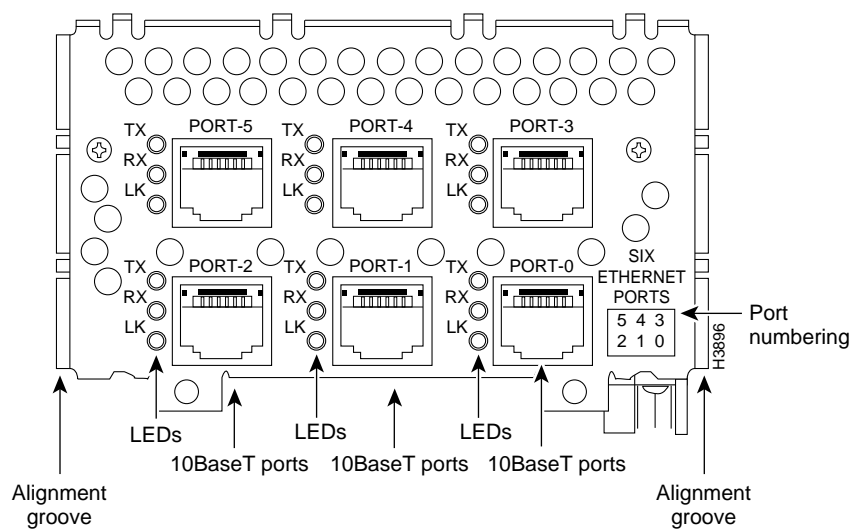
Figure 36   One-Port Ethernet NPM

Figure 37   Two-Port Ethernet NPM

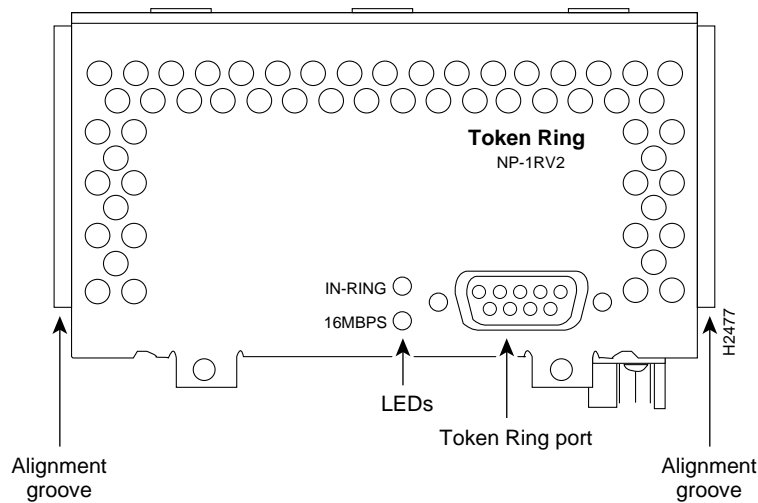**Figure 38   Six-Port Ethernet NPM**

Figure 39   One-Port Token Ring NPM

IN-RING

16MBPS

Token Ring

NP-1RV2

H2477

LEDs

Token Ring port

Alignment
groove

Alignment
groove

Figure 40   Two-Port Token Ring NPM

Token Ring

IN-RING B

IN-RING A

RING B

RING A

16MBPS

H1980

LEDs

Token Ring port

Token Ring port

Alignment
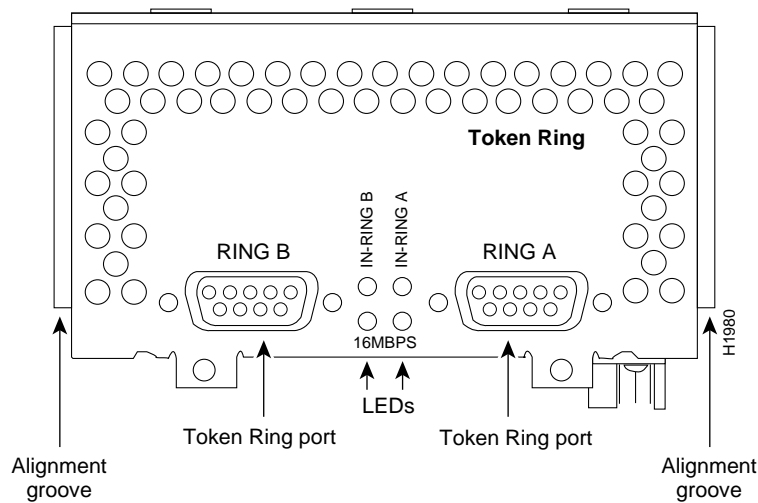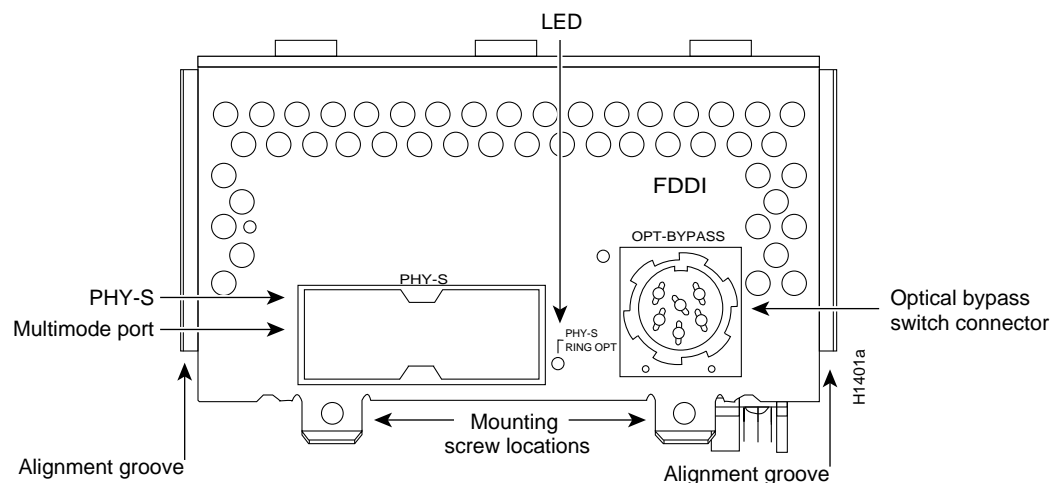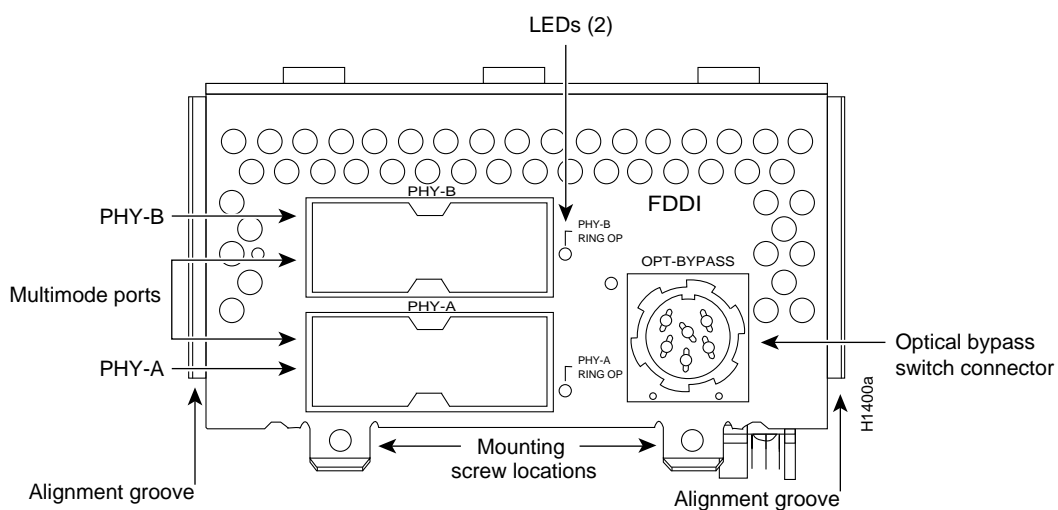groove

Alignment
groove

228

Figure 41　One-Port Single Attachment Multimode FDDI NPM

Figure 42　One-Port Dual Attachment Multimode FDDI NPM

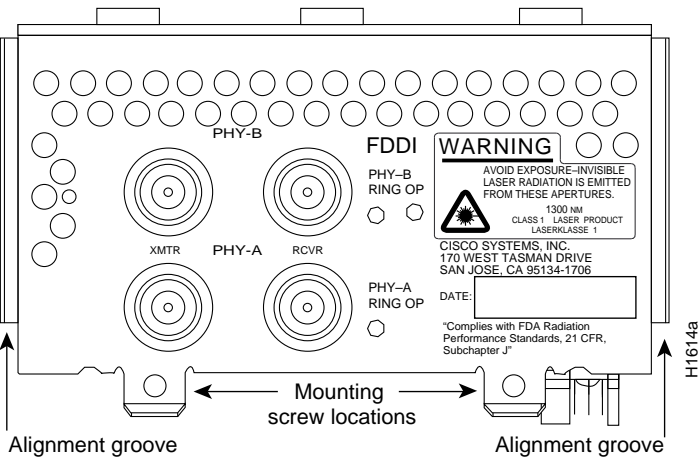**Figure 43   One-Port Dual Attachment Single-Mode FDDI NPM**

Figure 44   Two-Port Serial NPM
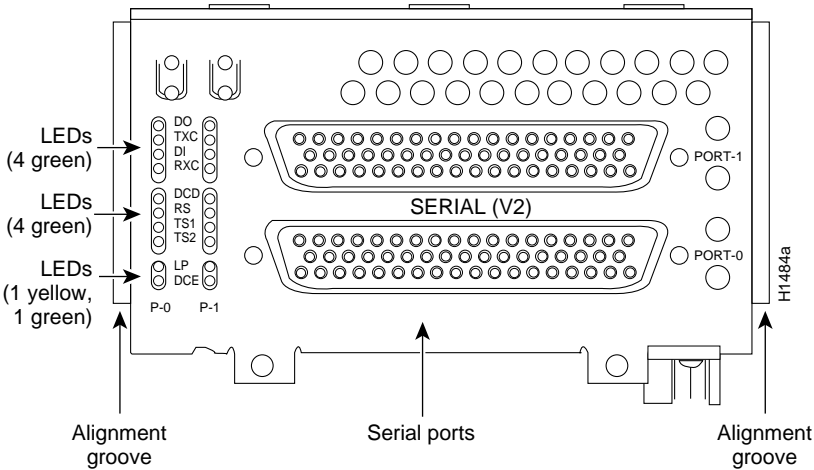

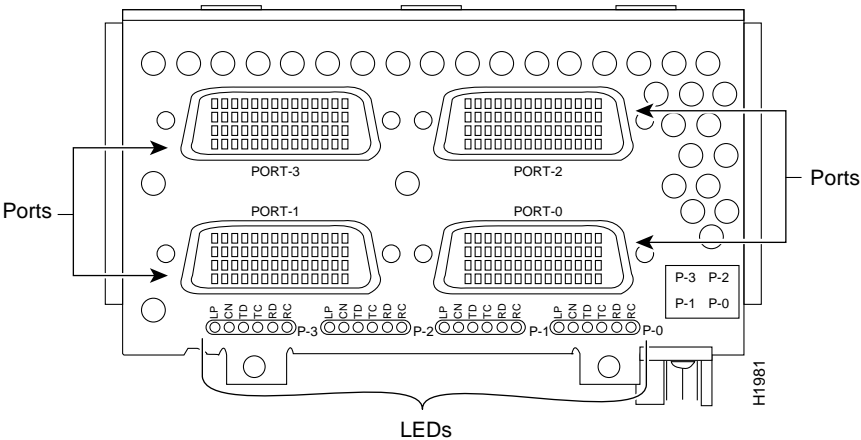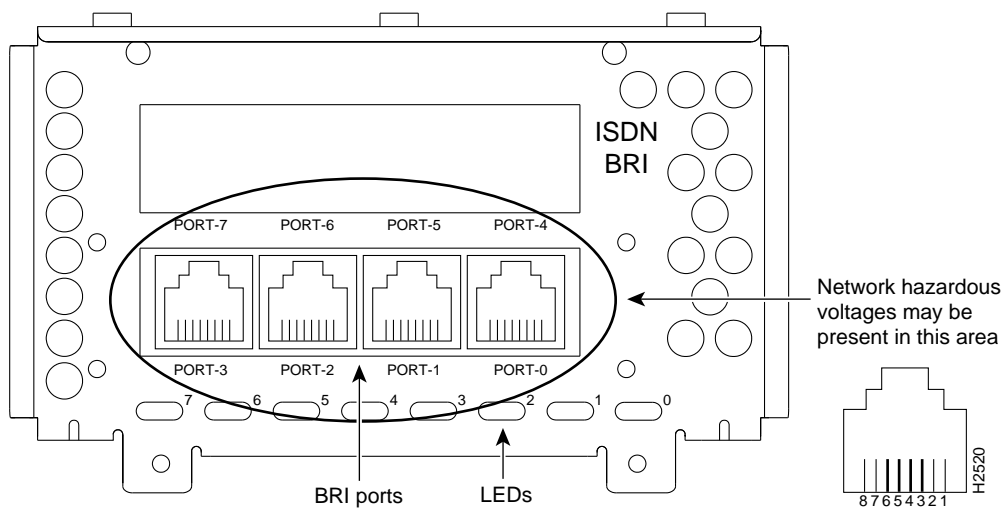**Figure 45   Four-Port Serial NPM**

Figure 46   Four-Port ISDN BRI NPM

Figure 47   Eight-Port ISDN BRI NPM

231
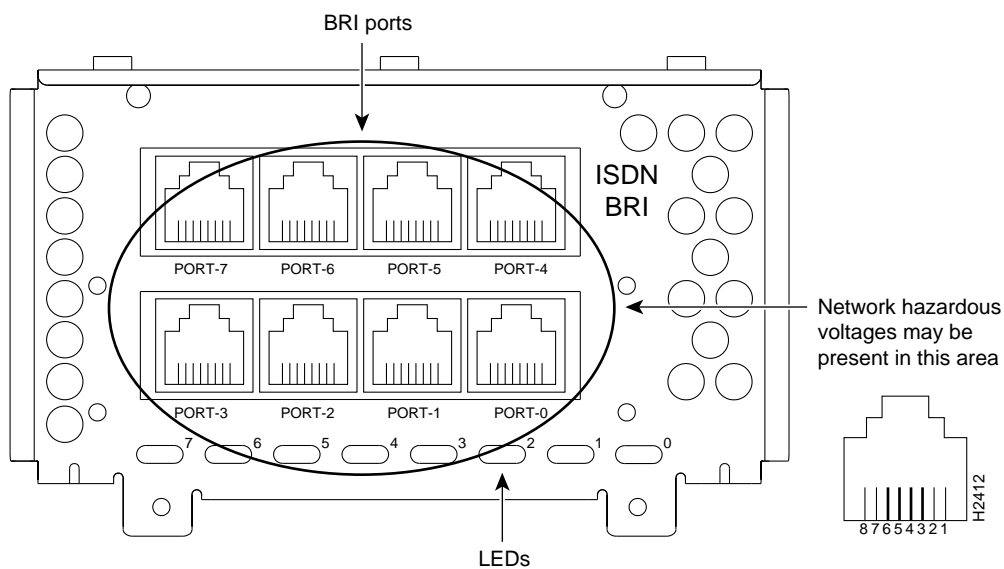
Figure 48   One-Port Channelized T1/ISDN PRI NPM
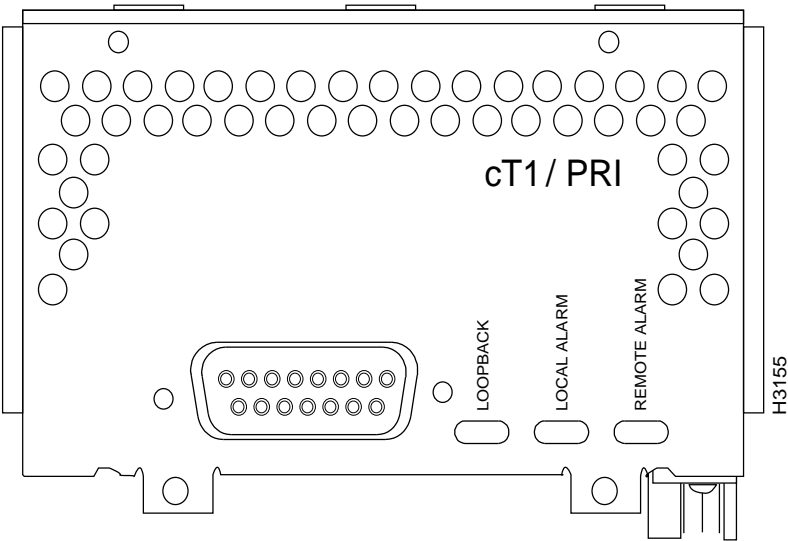
Figure 49   One-Port Channelized E1/ISDN PRI Balanced/Unbalanced NPM
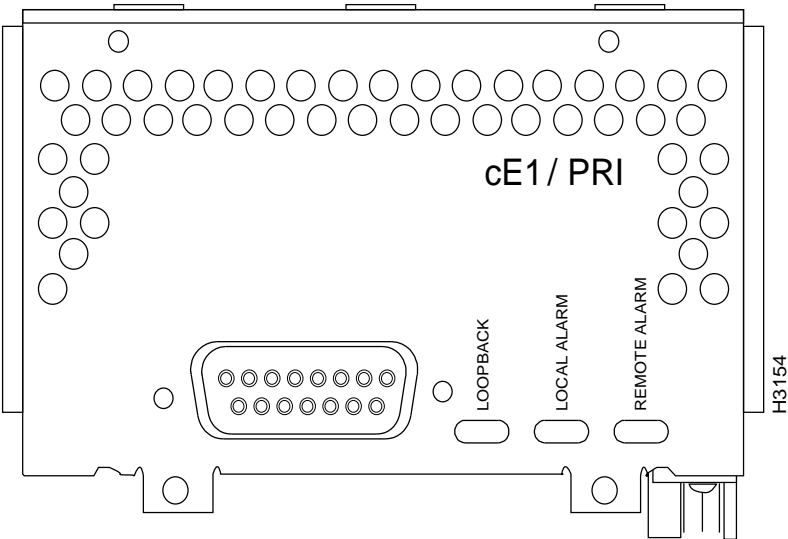
Figure 50   Four-Port Serial E1/G.703 Balanced/Unbalanced NPM

Ports

PORT-3

PORT-2

PORT-1

PORT-0

E1

E1

P-3   P-2

P-1   P-0

H2792

Ports

LP CN TD TC RD RC P-3   LP CN TD TC RD RC P-2   LP CN TD TC RD RC P-1   LP CN TD TC RD RC P-0

Alignment groove

LEDs

Alignment groove
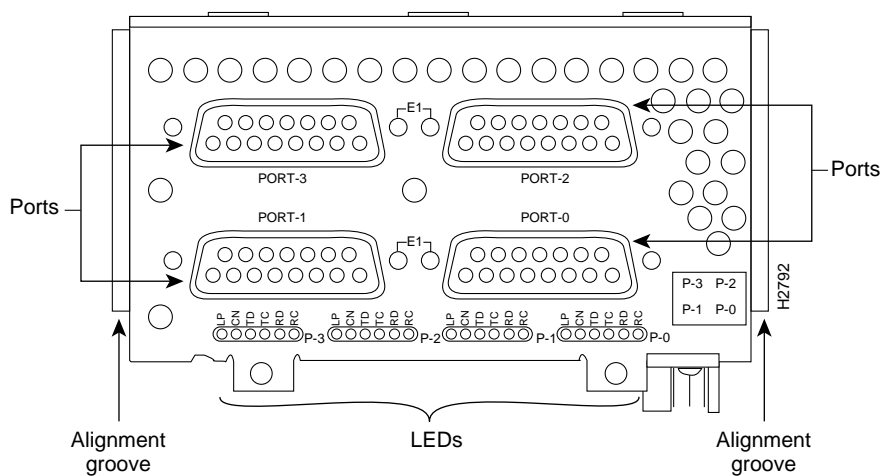
Figure 51   One-Port Single-Mode ATM OC-3c NPM

ATM SM

WARNING

AVOID EXPOSURE–INVISIBLE LASER RADIATION IS EMITTED FROM THESE APERTURES.

1300 NM
CLASS 1   LASER   PRODUCT
LASERKLASSE 1

XMTR   RCVR

CISCO SYSTEMS, INC.
170 W. TASMAN DRIVE
SAN JOSE CA. 95134

DATE:

BUSY   RX CELLS

READY   RX ALARM

"Complies with FDA Radiation Performance Standards, 21 CFR, Subchapter J"

H3157

Alignment groove

Alignment groove

233

Figure 52   One-Port Multimode ATM OC-3c NPM

Figure 53   One-Port ATM DS-3/E3

Software Options

The Cisco 4000 series routers support the following software releases:

- Cisco IOS Release 11.1 feature sets: Table 122

- Cisco IOS Release 11.0 feature sets: Table 123

- Cisco IOS Release 10.3 feature sets: Table 124

- Cisco IOS Release 10.2 feature sets (choice of seven): Table 125

The Cisco 4000 and Cisco 4000-M routers also support Cisco IOS Release 10.0. Traditional packaging for Cisco IOS Release 10.0 is listed in Table 126.

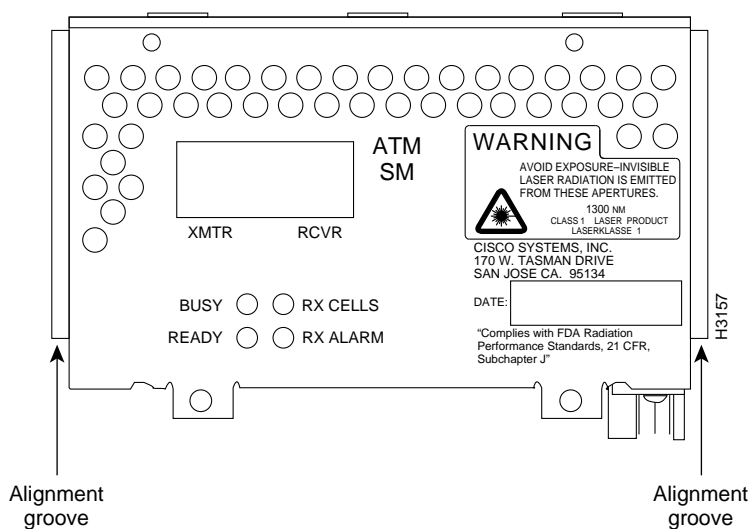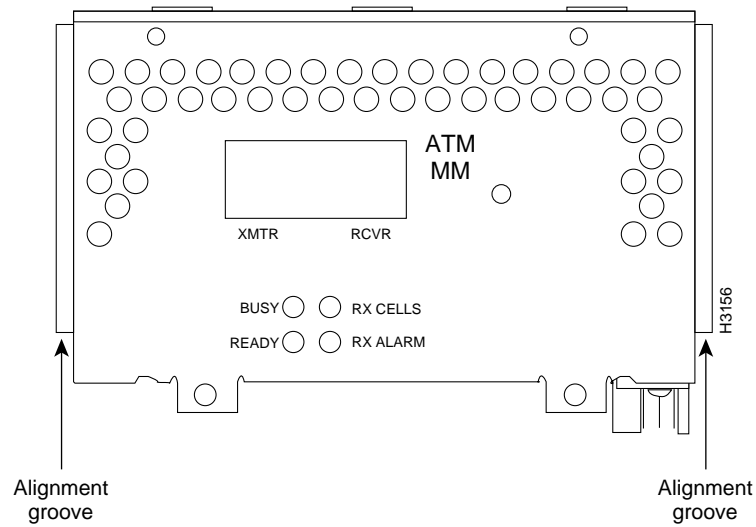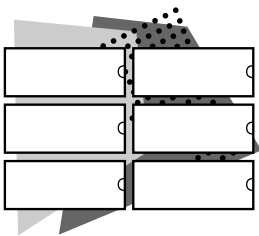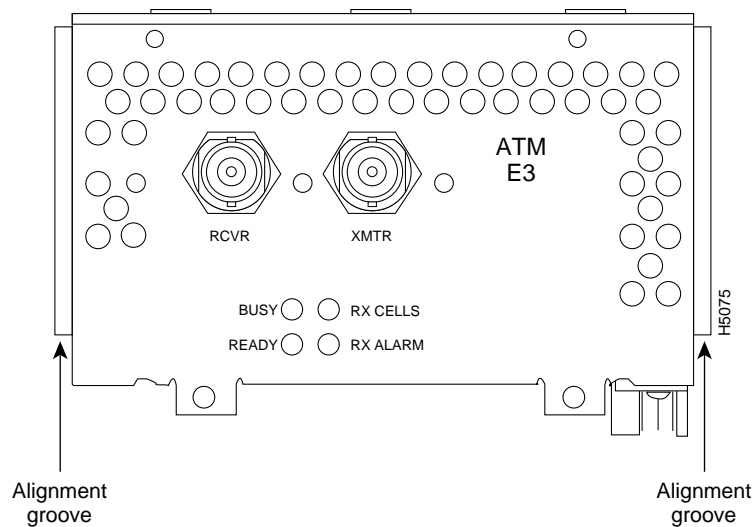**Note**   For all Cisco 4000 series routers, software must be ordered separately from the chassis. Traditional software packaging is no longer included in the base price of the system.

The Cisco 4000, Cisco 4500, and Cisco 4700 routers are no longer orderable, but Cisco IOS Releases 11.1, 11.0, 10.3, 10.2, and 10.0 are supported on Cisco 4000, Cisco 4500, and Cisco 4700 routers. The Cisco 4000, Cisco 4500, and Cisco 4700 routers have been replaced by the Cisco 4000-M, Cisco 4500-M, and Cisco 4700-M routers.

Table 122   Cisco IOS Release 11.1 Feature Sets—Cisco 4000 Series

Category	IP Routing	IP/IPX Routing	Desktop	Enterprise
LAN support	IP, transparent and translational bridging[1], concurrent routing and bridging, multiring, LAN extension host, GRE	IP, transparent and translational bridging[1], concurrent routing and bridging, multiring, LAN extension host, GRE, Novell IPX	IP, transparent and translational bridging[1], concurrent routing and bridging, multiring, LAN extension host, GRE, Novell IPX, AppleTalk 1 and 2, DECnet IV	IP, transparent and translational bridging[1], concurrent routing and bridging, multiring, LAN extension host, GRE, Novell IPX, AppleTalk 1 and 2, DECnet IV, DECnet V, OSI, XNS, Banyan VINES, Apollo Domain
WAN services	HDLC, PPP[2], X.25[3], Frame Relay, ISDN[4], SMDS, Switched 56	HDLC, PPP[2], X.25[3], Frame Relay, ISDN[4], SMDS, Switched 56, IPXWAN 2.0	HDLC, PPP[2], X.25[3],Frame Relay, ISDN[4], SMDS, Switched 56, IPXWAN 2.0	HDLC, PPP[2], X.25[3], Frame Relay, ISDN[4], SMDS, Switched 56, IPXWAN 2.0
WAN optimization	Header, link, and payload compression[5]; dial-on-demand; dial backup; bandwidth-on-demand; custom and priority queuing; weighted fair queuing; snapshot routing	Header[6], link, and payload compression[5]; dial-on-demand; dial backup; bandwidth-on-demand; custom and priority queuing; weighted fair queuing; snapshot routing	Header[6], link, and payload compression[5]; dial-on-demand; dial backup; bandwidth-on-demand; custom and priority queuing; weighted fair queuing; snapshot routing	Header[6], link and payload compression[5]; dial-on-demand; dial backup; bandwidth-on-demand; custom and priority queuing; weighted fair queuing; snapshot routing
IP routing	RIP, RIP Version 2, IGRP, Enhanced IGRP, OSPF, BGP, EGP, PIM, NHRP, policy-based routing	RIP, RIP Version 2, IGRP, Enhanced IGRP, OSPF, BGP, EGP, PIM, NHRP, policy-based routing	RIP, RIP Version 2, IGRP, Enhanced IGRP, OSPF, BGP, EGP, PIM, NHRP, policy-based routing	RIP, RIP Version 2, IGRP, Enhanced IGRP, OSPF, BGP, EGP, PIM, NHRP, policy-based routing, ES-IS, IS-IS
Other routing	–	IPX RIP, NLSP	IPX RIP, NLSP, RTMP, AURP, SMRP	IPX RIP, NLSP, RTMP, AURP, SMRP, SRTP

Category	IP Routing	IP/IPX Routing	Desktop	Enterprise
IBM support	Optional[7]: SRB/RSRB, SRT, DLSw+, SNA and NetBIOS WAN optimization via local acknowledgment, caching and filtering, SDLC integration, SDLC-to-LAN conversion (SDLLC), SDLC transport (STUN), Frame Relay SNA Support (RFC 1490), NetView Native Service Point, QLLC, Bisync, BAN for SNA Frame Relay support	Optional[7]: SRB/RSRB, SRT, DLSw+, SNA and NetBIOS WAN optimization via local acknowledgment, caching and filtering, SDLC integration, SDLC-to-LAN conversion (SDLLC), SDLC transport (STUN), Frame Relay SNA Support (RFC 1490), NetView Native Service Point, QLLC, Bisync, BAN for SNA Frame Relay support	Optional[7]: SRB/RSRB, SRT, DLSw+, SNA and NetBIOS WAN optimization via local acknowledgment, caching and filtering, SDLC integration, SDLC-to-LAN conversion (SDLLC), SDLC transport (STUN), Frame Relay SNA Support (RFC 1490), NetView Native Service Point, QLLC, Bisync, BAN for SNA Frame Relay support	Included: SRB/RSRB, SRT, DLSw+, SNA and NetBIOS WAN optimization via local acknowledgment, caching and filtering, SDLC integration, SDLC-to-LAN conversion (SDLLC), SDLC transport (STUN), Frame Relay SNA Support (RFC 1490), NetView Native Service Point, QLLC, Bisync, BAN for SNA Frame Relay support, TG/COS, Downstream PU Concentration (DSPU)
		Optional[8]: APPN		Optional[8]: APPN
Management	AutoInstall, SNMP, RMON events and alarms[9], Telnet, automatic modem configuration[10]	AutoInstall, SNMP, RMON events and alarms[9], Telnet, automatic modem configuration[10]	AutoInstall, SNMP, RMON events and alarms[9], Telnet, automatic modem configuration[10]	AutoInstall, SNMP, RMON events and alarms[9], Telnet, automatic modem configuration
Security	Access lists, extended access lists, access security, TACACS+, RADIUS, MD5 routing authentication, Lock and Key	Access lists, extended access lists, access security, TACACS+, RADIUS, MD5 routing authentication, Lock and Key	Access lists, extended access lists, access security, TACACS+, RADIUS, MD5 routing authentication, Lock and Key	Access lists, extended access lists, access security, TACACS+, RADIUS, MD5 routing authentication, Lock and Key, Kerberized login
Protocol translation	–	–	–	Telnet, LAT, rlogin, TN3270, X.25, PPP
Remote node[11]	SLIP, PPP, CSLIP, CPPP, DHCP, IP pooling, async master interfaces, NetBEUI over PPP	SLIP, PPP, CSLIP, CPPP, DHCP, IP pooling, async master interfaces, IPXCP[6], NetBEUI over PPP	SLIP, PPP, CSLIP, CPPP, DHCP, IP pooling, async master interfaces, IPXCP[6], NetBEUI over PPP, MacIP, ATCP	SLIP, PPP, CSLIP, CPPP, DHCP, IP pooling, async master interfaces, IPX and ARAP on virtual async interfaces, IPXCP[6], NetBEUI over PPP, MacIP, ATCP
Terminal services[11]	Telnet, rlogin, X.25 PAD	Telnet, rlogin, X.25 PAD	Telnet, rlogin, X.25 PAD	Telnet, rlogin, X.25 PAD, Xremote, LAT[12], TN3270
Product numbers	See Table 128.	See Table 128.	See Table 128.	See Table 128.

1. See the category "IBM Support" for information about source-route bridging (SRB).
2. PPP includes support for LAN protocols supported by the feature set, address negotiation, PAP and CHAP authentication, and PPP compression. Multilink PPP is available in Cisco IOS Release 11.0(4) and later releases.
3. Includes X.25 switching.
4. ISDN support includes calling line identification (ANI), X.25 over the B channel, ISDN subaddressing, asynchronous ISDN access, and applicable WAN optimization features.
5. X.25 and Frame Relay payload compression.
6. IPX header compression (RFC 1553) is available in Cisco IOS Release 11.1(1) and later releases.
7. "Optional" means a separate Cisco IOS feature set with the IBM base option: IP/IBM base, IP/IPX/IBM base, Desktop/IBM base.
8. "Optional" means separate Cisco IOS feature sets: IP/IPX/IBM base/APPN and Enterprise/APPN.
9. RMON (events and alarms) is supported on all interfaces.
10. Automatic modem configuration is available for all feature sets in Cisco IOS Release 11.1(2) and later releases. For the Enterprise feature set, automatic modem configuration is available in Cisco IOS Release 11.1(1) and later releases.
11. Limited support on router auxiliary ports.
12. Use of LAT requires terminal license (FS-L8-10.X= for an 8-user license or FS-L16-10.X= for a 16-user license).

Table 123   Cisco IOS Release 11.0 Feature Sets—Cisco 4000 Series

Category	IP Routing	IP/IPX Routing	Desktop	Enterprise
LAN support	IP, transparent and translational bridging[1], concurrent routing and bridging, multiring, LAN extension host, GRE	IP, transparent and translational bridging[1], concurrent routing and bridging, multiring, LAN extension host, GRE, Novell IPX	IP, transparent and translational bridging[1], concurrent routing and bridging, multiring, LAN extension host, GRE, Novell IPX, AppleTalk 1 and 2, DECnet IV	IP, transparent and translational bridging[1], concurrent routing and bridging, multiring, LAN extension host, GRE, Novell IPX, AppleTalk 1 and 2, DECnet IV, DECnet V, OSI, XNS, Banyan VINES, Apollo Domain
WAN services	HDLC, PPP[2], X.25[3], Frame Relay, ISDN[4], SMDS, Switched 56	HDLC, PPP[2], X.25[3], Frame Relay, ISDN[4], SMDS, Switched 56, IPXWAN 2.0	HDLC, PPP[2], X.25[3], Frame Relay, ISDN[4], SMDS, Switched 56, IPXWAN 2.0	HDLC, PPP[2], X.25[3], Frame Relay, ISDN[4], SMDS, Switched 56, IPXWAN 2.0
WAN optimization	Header, link, and payload compression[5]; dial-on-demand; dial backup; bandwidth-on-demand; custom and priority queuing; weighted fair queuing; snapshot routing	Header, link, and payload compression[5]; dial-on-demand; dial backup; bandwidth-on-demand; custom and priority queuing; weighted fair queuing; snapshot routing	Header, link, and payload compression[5]; dial-on-demand; dial backup; bandwidth-on-demand; custom and priority queuing; weighted fair queuing; snapshot routing	Header, link and payload compression[5]; dial-on-demand; dial backup; bandwidth-on-demand; custom and priority queuing; weighted fair queuing; snapshot routing
IP routing	RIP, IGRP, Enhanced IGRP, OSPF, BGP, EGP, PIM, NHRP, policy-based routing	RIP, IGRP, Enhanced IGRP, OSPF, BGP, EGP, PIM, NHRP, policy-based routing	RIP, IGRP, Enhanced IGRP, OSPF, BGP, EGP, PIM, NHRP, policy-based routing	RIP, IGRP, Enhanced IGRP, OSPF, BGP, EGP, PIM, NHRP, policy-based routing, ES-IS, IS-IS
Other routing	–	IPX RIP, NLSP	IPX RIP, NLSP, RTMP, AURP, SMRP	IPX RIP, NLSP, RTMP, AURP, SMRP, SRTP
IBM support	Optional[6]: SRB/RSRB, SRT, DLSw+, SNA and NetBIOS WAN optimization via local acknowledgment, caching and filtering, SDLC integration, SDLC-to-LAN conversion (SDLLC), SDLC transport (STUN), Frame Relay SNA Support (RFC 1490), NetView Native Service Point, QLLC[7], Bisync[7]	Optional[6]: SRB/RSRB, SRT, DLSw+, SNA and NetBIOS WAN optimization via local acknowledgment, caching and filtering, SDLC integration, SDLC-to-LAN conversion (SDLLC), SDLC transport (STUN), Frame Relay SNA Support (RFC 1490), NetView Native Service Point, QLLC[8], Bisync[8]	Optional[6]: SRB/RSRB, SRT, DLSw+, SNA and NetBIOS WAN optimization via local acknowledgment, caching and filtering, SDLC integration, SDLC-to-LAN conversion (SDLLC), SDLC transport (STUN), Frame Relay SNA Support (RFC 1490), NetView Native Service Point, QLLC[8], Bisync[8]	Included: SRB/RSRB, SRT, DLSw+, SNA and NetBIOS WAN optimization via local acknowledgment, caching and filtering, SDLC integration, SDLC-to-LAN conversion (SDLLC), SDLC transport (STUN), Frame Relay SNA Support (RFC 1490), NetView Native Service Point, QLLC, Bisync, TG/COS, Downstream PU Concentration (DSPU)
		Optional[9]: APPN		Optional[9]: APPN
Management	AutoInstall, SNMP, Telnet	AutoInstall, SNMP, Telnet	AutoInstall, SNMP, Telnet	AutoInstall, SNMP, Telnet
Security	Access lists, extended access lists, access security, TACACS+, MD5 routing authentication	Access lists, extended access lists, access security, TACACS+, MD5 routing authentication	Access lists, extended access lists, access security, TACACS+, MD5 routing authentication	Access lists, extended access lists, access security, TACACS+, MD5 routing authentication
Protocol translation	–	–	–	Telnet, LAT, rlogin, TN3270, X.25, PPP
Remote node[10]	SLIP, PPP, CSLIP, CPPP, DHCP	SLIP, PPP, CSLIP, CPPP, DHCP, IPXCP	SLIP, PPP, CSLIP, CPPP, DHCP, IPXCP, MacIP, ATCP	SLIP, PPP, CSLIP, CPPP, DHCP, IPXCP, MacIP, ATCP

Category	IP Routing	IP/IPX Routing	Desktop	Enterprise
Terminal services[10]	Telnet, rlogin, X.25 PAD	Telnet, rlogin, X.25 PAD	Telnet, rlogin, X.25 PAD	Telnet, rlogin, X.25 PAD, Xremote, LAT[11], TN3270
Product numbers	See Table 128.	See Table 128.	See Table 128.	See Table 128.

1. See the category "IBM Support" for information about source-route bridging (SRB).

2. PPP includes support for LAN protocols supported by the feature set, address negotiation, PAP and CHAP authentication, and PPP compression. Multilink PPP is available in Cisco IOS Release 11.0(4) and later releases.

3. Includes X.25 switching.

4. ISDN support includes calling line identification (ANI), X.25 over the B channel, ISDN subaddressing, and applicable WAN optimization features.

5. X.25 payload compression. Frame Relay payload compression is available in Cisco IOS Release 11.0(4) and later releases.

6. "Optional" means a separate Cisco IOS feature set with the IBM base option: IP/IBM base, IP/IPX/IBM base, Desktop/IBM base.

7. QLLC and Bisync are available in IP/IBM base in Cisco IOS Release 11.0(3).

8. QLLC and Bisync are available in IP/IPX/IBM base and Desktop/IBM base in Cisco IOS Release 11.0(2).

9. "Optional" means separate Cisco IOS feature sets: IP/IPX/IBM base/APPN and Enterprise/APPN.

10. Limited support on router auxiliary ports.

11. Use of LAT requires terminal license (FS-L8-10.X= for an 8-user license or FS-L16-10.X= for a 16-user license).

Table 124   Cisco IOS Release 10.3 Feature Sets—Cisco 4000 Series

Category	IP Routing	IP/IPX Routing	Desktop	Enterprise
LAN support	IP, transparent and translational bridging[1], multiring, LAN extension host	IP, transparent and translational bridging[1], multiring, LAN extension host, Novell IPX	IP, transparent and translational bridging[1], multiring, LAN extension host, Novell IPX, AppleTalk 1 and 2, DECnet IV	IP, transparent and translational bridging[1], multiring, LAN extension host, Novell IPX, AppleTalk 1 and 2, DECnet IV, DECnet V, OSI, XNS, Banyan VINES, Apollo Domain
WAN services	HDLC, PPP[2], X.25[3], Frame Relay, ISDN[4], SMDS, Switched 56	HDLC, PPP[2], X.25[3], Frame Relay, ISDN[4], SMDS, Switched 56, IPXWAN 2.0	HDLC, PPP[2], X.25[3], Frame Relay, ISDN[4], SMDS, Switched 56, IPXWAN 2.0	HDLC, PPP[2], X.25[3], Frame Relay, ISDN[4], SMDS, Switched 56, IPXWAN 2.0
WAN optimization	Header, link, and payload compression[5]; dial-on-demand; dial backup; bandwidth-on-demand; custom and priority queuing; snapshot routing	Header, link, and payload compression[5]; dial-on-demand; dial backup; bandwidth-on-demand; custom and priority queuing; snapshot routing	Header, link, and payload compression[5]; dial-on-demand; dial backup; bandwidth-on-demand; custom and priority queuing; snapshot routing	Header, link, and payload compression[5]; dial-on-demand; dial backup; bandwidth-on-demand; custom and priority queuing; snapshot routing
IP routing	RIP, IGRP, Enhanced IGRP, OSPF, BGP, EGP, PIM, NHRP	RIP, IGRP, Enhanced IGRP, OSPF, BGP, EGP, PIM, NHRP	RIP, IGRP, Enhanced IGRP, OSPF, BGP, EGP, PIM, NHRP	RIP, IGRP, Enhanced IGRP, OSPF, BGP, EGP, PIM, NHRP, ES-IS, IS-IS
Other routing	–	IPX RIP, NLSP	IPX RIP, NLSP[6], RTMP, AURP	IPX RIP, NLSP, RTMP, AURP, SRTP
IBM support	Optional[7]: SRB/RSRB, SRT, DLSw+[8], SNA and NetBIOS WAN optimization via local acknowledgment, caching and filtering, SDLC integration, SDLC-to-LAN conversion (SDLLC), SDLC transport (STUN), Frame Relay SNA Support (RFC 1490)	Optional[7]: SRB/RSRB, SRT, DLSw+[8], SNA and NetBIOS WAN optimization via local acknowledgment, caching and filtering, SDLC integration, SDLC-to-LAN conversion (SDLLC), SDLC transport (STUN), Frame Relay SNA Support (RFC 1490)	Optional[7]: SRB/RSRB, SRT, DLSw+[8], SNA and NetBIOS WAN optimization via local acknowledgment, caching and filtering, SDLC integration, SDLC-to-LAN conversion (SDLLC), SDLC transport (STUN), Frame Relay SNA Support (RFC 1490)	Included: SRB/RSRB, SRT, DLSw+[8], SNA and NetBIOS WAN optimization via local acknowledgment, caching and filtering, SDLC integration, SDLC-to-LAN conversion (SDLLC), SDLC transport (STUN), Frame Relay SNA Support (RFC 1490), TG/COS, QLLC, Downstream PU Concentration (DSPU)

Category	IP Routing	IP/IPX Routing	Desktop	Enterprise
Management	AutoInstall, SNMP, Telnet	AutoInstall, SNMP, Telnet	AutoInstall, SNMP, Telnet	AutoInstall, SNMP, Telnet
Security	Access lists, extended access lists, access security, TACACS+	Access lists, extended access lists, access security, TACACS+	Access lists, extended access lists, access security, TACACS+	Access lists, extended access lists, access security, TACACS+
Protocol translation	Not included	Not included	Not included	Telnet, LAT, rlogin, TN3270, X.25, PPP
Remote node[9]	SLIP, PPP, CSLIP, CPPP, DHCP[10]	SLIP, PPP, CSLIP, CPPP, DHCP[10]	SLIP, PPP, CSLIP, CPPP, IPXCP, MacIP, ATCP[10], DHCP[10]	SLIP, PPP, CSLIP, CPPP, IPXCP, MacIP, ATCP[10], DHCP[10]
Terminal services[9]	Telnet, rlogin, X.25 PAD	Telnet, rlogin, X.25 PAD	Telnet, rlogin, X.25 PAD	Telnet, rlogin, X.25 PAD, Xremote, LAT[11], TN3270
Product numbers	See Table 128.	See Table 128.	See Table 128.	See Table 128.

1. See the category "IBM Support" in this table for information about source-route bridging (SRB).
2. PPP includes support for LAN protocols supported by the feature set, PAP and CHAP authentication, and PPP compression.
3. Includes X.25 switching.
4. ISDN support includes calling line identification (ANI), X.25 over the B channel, ISDN subaddressing, and applicable WAN optimization features
5. X.25 payload compression.
6. NLSP is supported with the Desktop option in Cisco IOS Release 10.3(2) and later releases.
7. "Optional" means a separate Cisco IOS feature set with the IBM base option: IP/IBM base, IP/IPX/IBM base, or Desktop/IBM base.
8. DLSw+ is supported in Cisco IOS Release 10.3(2) and later releases.
9. Limited support on router auxiliary ports.
10. ATCP and DHCP proxy client is supported in Cisco IOS Release 10.3(3) and later releases.
11. Use of LAT requires terminal license (FS-L8-10.X= for an 8-user license or FS-L16-10.X= for a 16-user license).

Table 125   Cisco IOS Release 10.2 Feature Sets—Cisco 4000 Series

Category	IP Routing	IP/IPX Routing[1]	Desktop	Enterprise
LAN support	IP; transparent, translational, and source-route bridging; LAN extension host	IP; transparent, translational, and source-route bridging; LAN extension host; Novell IPX	IP; transparent, translational, and source-route bridging; LAN extension host; Novell IPX; AppleTalk Phase 1 and 2; DECnet IV	IP; transparent, translational, and source-route bridging; LAN extension host; Novell IPX; AppleTalk Phase 1 and 2; DECnet IV; DECnet V; XNS; Banyan VINES; OSI; Apollo Domain
WAN services	HDLC, PPP[2], X.25[3], Frame Relay, ISDN[4], SMDS[5], Switched 56	HDLC, PPP[2], X.25[3], Frame Relay, ISDN[4], IPXWAN SMDS[5], Switched 56	HDLC, PPP[2], X.25[3], Frame Relay, ISDN[4], IPXWAN, SMDS[5], Switched 56	HDLC, PPP[2], X.25[3], Frame Relay, ISDN[4], IPXWAN, SMDS, Switched 56
WAN optimization	Header, link, and payload compression[6]; dial-on-demand; dial backup; bandwidth-on-demand; custom and priority queuing; snapshot routing	Header, link, and payload compression[6]; dial-on-demand; dial backup; bandwidth-on-demand; custom and priority queuing; snapshot routing	Header, link, and payload compression[6]; dial-on-demand; dial backup; bandwidth-on-demand; custom and priority queuing; snapshot routing	Header, link, and payload compression[6]; dial-on-demand; dial backup; bandwidth-on-demand; custom and priority queuing; snapshot routing
IP routing	RIP, IGRP, Enhanced IGRP, OSPF, BGP, EGP, PIM	RIP, IGRP, Enhanced IGRP, OSPF, BGP, EGP, PIM	RIP, IGRP, Enhanced IGRP, OSPF, BGP, EGP, PIM	RIP, IGRP, Enhanced IGRP, OSPF, BGP, EGP, PIM, ES-IS, IS-IS
Other routing	–	IPX RIP	IPX RIP, RTMP, AURP	IPX RIP, RTMP, AURP, SRTP

Category	IP Routing	IP/IPX Routing[1]	Desktop	Enterprise
IBM support	Optional[7]: RSRB; SNA and NetBIOS WAN optimization via local acknowledgment, caching, and filtering[8]	Optional[7]: RSRB; SNA and NetBIOS WAN optimization via local acknowledgment, caching, and filtering[9]	Optional[7]: RSRB; SNA and NetBIOS WAN optimization via local acknowledgment, caching, and filtering[10]	Included: RSRB; SNA and NetBIOS WAN optimization via local acknowledgment, caching, and filtering; SDLC integration; SDLC-to-LAN conversion (SDLLC); SDLC transport (STUN); TG/COS; QLLC
Management	AutoInstall, SNMP, Telnet	AutoInstall, SNMP, Telnet	AutoInstall, SNMP, Telnet	AutoInstall, SNMP, Telnet
Security	Access lists, extended access lists, access security, TACACS	Access lists, extended access lists, access security, TACACS	Access lists, extended access lists, access security, TACACS	Access lists, extended access lists, access security, TACACS
Protocol translation	–	–	–	Telnet, LAT, rlogin, TN3270, X.25
Remote node[11]	SLIP, CSLIP, PPP, CPPP	SLIP, CSLIP, PPP, CPPP, IPXCP	SLIP, CSLIP, PPP, CPPP, IPXCP, MacIP	SLIP, CSLIP, PPP, CPPP, IPXCP, MacIP
Terminal services[11]	Telnet, rlogin, X.25 PAD	Telnet, rlogin, X.25 PAD	Telnet, rlogin, X.25 PAD	Telnet, rlogin, X.25 PAD, LAT[12], TN3270
Product numbers	See Table 128.	See Table 128.	See Table 128.	See Table 128.

1. Only available with Cisco IOS Release 10.2(2) and later releases.
2. PPP includes support for LAN protocols supported by the feature set, address negotiation, and PAP and CHAP authentication.
3. Includes X.25 switching.
4. ISDN support includes calling line identification (ANI), X.25 over the B channel, ISDN subaddressing, and applicable WAN optimization.
5. Prior to Cisco IOS Release 10.2(2), SMDS was only available as part of the Enterprise set.
6. X.25 payload compression.
7. "Optional" means a separate Cisco IOS feature set with the IBM base option: IP/IBM base, IP/IPX/IBM base, or Desktop/IBM base.
8. To obtain the IBM base functionality option with the IP routing feature set, order product number SF25CS-10.2.2 or later.
9. To obtain the IBM base functionality option with the IP/IPX routing feature set, order product number SF25DS-10.2.2 or later.
10. To obtain the IBM base functionality option with the Desktop feature set, order product number SF25BS-10.2.2 or later.
11. Limited support on router auxiliary ports.
12. Use of LAT requires terminal license (FS-L8-10.X= for an 8-user license or FS-L16-10.X= for a 16-user license).

Traditional software packaging is no longer included in the base price of the Cisco 4000 series system. Cisco IOS Release 10.0 it is still orderable for the Cisco 4000 and Cisco 4000-M routers. Table 126 lists the product numbers for traditional software packaging. (Product numbers beginning with SF- are not orderable for the Cisco 4000 and Cisco 4000-M routers. For these routers, you can only order software as spares.) Table 127 describes the contents of each traditional software feature license.

Table 126   Traditional Software Product Numbers—Cisco 4000 and Cisco 4000-M

Description	Product Numbers Cisco IOS Release 10.0[1]
Router software	SF-G4-10.0.x SW-G4-10.0.x= SF-G4P-10.0.x SW-G4P-10.0.x=
Feature: standard	FR-S4-10.0.X FR-S4-10.0.X=

Description	Product Numbers Cisco IOS Release 10.0[1]
Feature: bridging	FR-B4-10.0.X=
Feature: packet switching[2]	FR-X4-10.0.X=
Feature: protocol translation	FR-P4-10.0.X

1. The Cisco 4000 requires a minimum of 4 MB of Flash memory, 16 MB of main DRAM, and 1 MB of shared DRAM for Cisco IOS Release 10.0(4) and later releases. The Cisco 4000-M requires a minimum of 4 MB of Flash memory, 8 MB of main DRAM, and 4 MB of shared DRAM.
2. Includes the Defense Data Network (DDN) X.25 option.

Table 127   Cisco IOS Software Release 10.0 Traditional Software Description—Cisco 4000 and Cisco 4000-M

Category	Protocols/Features	Feature License
LAN support	IP, Novell IPX, AppleTalk I and II, DECnet IV and V, OSI, XNS, Banyan VINES, Apollo Domain, GRE	Standard
	Transparent, translational, and source-route bridging, multiring	Bridging option
WAN services	HDLC, PPP[1], ISDN[2], IPXWAN, Switched 56	Standard
	X.25, Frame Relay, SMDS	Packet-switching option
WAN optimization	Header and link compression, dial-on-demand, dial backup, bandwidth-on-demand, custom and priority queuing	Standard
IP routing	RIP, IGRP, Enhanced IGRP, OSPF, BGP, EGP, ES-IS, IS-IS	Standard
Other routing	IPX RIP, RTMP, SRTP	Standard
IBM support	RSRB, SNA and NetBIOS WAN optimization via local acknowledgment, SDLC Integration, SDLC-to-LAN conversion (SDLLC), SDLC transport (STUN), TG/COS	Bridging option
Management	AutoInstall, SNMP, Telnet	Standard
Security	Access lists, access security, TACACS	Standard
Protocol translation	Telnet, LAT, rlogin, TN3270, X.25	Protocol translation option
Remote node[3]	SLIP, CSLIP, PPP, CPPP, IPXCP, MacIP	Standard
Terminal services[3]	Telnet, rlogin	Standard
	X.25 PAD, LAT	Protocol translation option

1. PPP includes support for LAN protocols supported by the feature set, PAP and CHAP authentication, and PPP compression.
2. ISDN support includes calling line identification (ANI), X.25 over the B channel, ISDN subaddressing, and applicable WAN optimization features.
3. Supported on the router auxiliary port.

Table 128 lists the software feature set product numbers for Cisco IOS Releases 11.1, 11.0, 10.3, and 10.2.

Table 128   Cisco IOS Software Product Numbers—Cisco 4000 Series

Description	Cisco 4000 and Cisco 4000-M[1] Product Numbers	Cisco 4500, Cisco 4500-M, and 4700-M[1] Product Numbers
IP	SF-G4C-xx.x.x SW-G4C-xx.x.x=	SF-G45C-xx.x.x SW-G45C-xx.x.x=
IP with IBM base	SF-G4CS-xx.x.x SW-G4CS-xx.x.x=	SF-G45CS-xx.x.x SW-G45CS-xx.x.x=
IP/IPX	SF-G4D-xx.x.x SW-G4D-xx.x.x=	SF-G45D-xx.x.x SW-G45D-xx.x.x=
IP/IPX with IBM base	SF-G4DS-xx.x.x SW-G4DS-xx.x.x=	SF-G45DS-xx.x.x= SW-G45DS-xx.x.x=
IP/IPX with IBM base and APPN	SF-G4DSN-xx.x.x SW-G4DSN-xx.x.x=	SF-G45DSN-xx.x.x SW-G45DSN-xx.x.x=
Desktop	SF-G4B-xx.x.x SW-G4B-xx.x.x=	SF-G45B-xx.x.x SW-G45B-xx.x.x=
Desktop with IBM base	SF-G4BS-xx.x.x SW-G4BS-xx.x.x=	SF-G45BS-xx.x.x SW-G45BS-xx.x.x=
Enterprise	SF-G4A-xx.x.x SW-G4A-xx.x.x=	SF-G45A-xx.x.x SW-G45A-xx.x.x=
Enterprise with APPN	SF-G4AN-xx.x.x SW-G4AN-xx.x.x=	SF-G45AN-xx.x.x SW-G45AN-xx.x.x=

1. Substitute the release number for xx.x.x in the product number (for example, SW-G4C-11.1.1=).

Feature sets for Cisco IOS Releases 11.1, 11.0, 10.3, and 10.2 can be upgraded as described in Table 129. To order an upgrade, you must use two product numbers; one represents the upgrade license, and the other represents the software. For example, to upgrade from an IP feature set to an IP feature set with IBM base functionality, order product number FR-G4X-CCS= (the upgrade license) and SW-G4CS-xx.x.x= (the software for a Cisco 4000-M). To upgrade to a feature set with APPN, you must first purchase the upgrade license for the desired feature set and then purchase the upgrade license and upgrade software for the APPN feature set.

Table 129   Cisco IOS Software Upgrades—Cisco 4000 Series

Feature Set Upgrade	Cisco 4000 and Cisco 4000-M Product Numbers[1]	Cisco 4500, Cisco 4500-M, and Cisco 4700-M Product Numbers[1]
IP to IP with IBM base functionality	FR-G4X-CCS= and SW-G4CS-xx.x.x=	FR-G4X-CCS= and SW-G45CS-xx.x.x=
IP to IP/IPX	FR-G4X-CD= and SW-G4D-xx.x.x=	FR-G4X-CD= and SW-G45D-xx.x.x=
IP to IP/IPX with IBM base functionality	FR-G4X-CDS= and SW-G4DS-xx.x.x=	FR-G4X-CDS= and SW-G45DS-xx.x.x=
IP to IP/IPX with IBM base functionality and APPN	FR-G4X-CDS=, FR-G4X-APPN=, and SW-G4DSN-xx.x.x=	FR-G4X-CDS=, FR-G4X-APPN=, and SW-G45DSN-xx.x.x=
IP to Desktop	FR-G4X-CB= and SW-G4B-xx.x.x=	FR-G4X-CB= and SW-G45B-xx.x.x=
IP to Desktop with IBM base functionality	FR-G4X-CBS= and SW-G4BS-xx.x.x=	FR-G4X-CBS= and SW-G45BS-xx.x.x=

Feature Set Upgrade	Cisco 4000 and Cisco 4000-M Product Numbers[1]	Cisco 4500, Cisco 4500-M, and Cisco 4700-M Product Numbers[1]
IP to Enterprise	FR-G4X-CA= and SW-G4A-xx.x.x=	FR-G4X-CA= and SW-G45A-xx.x.x=
IP to Enterprise and APPN	FR-G4X-CA=, FR-G4X-APPN=, and SW-G4AN-xx.x.x=	FR-G4X-CA=, FR-G4X-APPN=, and SW-G45AN-xx.x.x=
IP with IBM base to IP/IPX with IBM base functionality	FR-G4X-CSDS= and SW-G4DS-xx.x.x=	FR-G4X-CSDS= and SW-G45DS-xx.x.x=
IP with IBM base to IP/IPX with IBM base functionality and APPN	FR-G4X-CSDS=, FR-G4X-APPN=, and SW-G4DSN-xx.x.x=	FR-G4X-CSDS=, FR-G4X-APPN=, and SW-G45DSN-xx.x.x=
IP with IBM base to Desktop with IBM base functionality	FR-G4X-CSBS= and SW-G4BS-xx.x.x=	FR-G4X-CSBS= and SW-G45BS-xx.x.x=
IP with IBM base functionality to Enterprise	FR-G4X-CSA= and SW-G4A-xx.x.x=	FR-G4X-CSA= and SW-G45A-xx.x.x=
IP with IBM base functionality to Enterprise and APPN	FR-G4X-CSA=, FR-G4X-APPN=, and SW-G4AN-xx.x.x=	FR-G4X-CSA=, FR-G4X-APPN=, and SW-G45AN-xx.x.x=
IP/IPX to IP/IPX with IBM base functionality	FR-G4X-DDS= and SW-G4DS-xx.x.x=	FR-G4X-DDS= and SW-G45DS-xx.x.x=
IP/IPX to IP/IPX with IBM base functionality and APPN	FR-G4X-DDS=, FR-G4X-APPN=, and SW-G4DSN-xx.x.x=	FR-G4X-DDS=, FR-G4X-APPN=, and SW-G45DSN-xx.x.x=
IP/IPX to Desktop	FR-G4X-DB= and SW-G4B-xx.x.x=	FR-G4X-DB= and SW-G45B-xx.x.x=
IP/IPX to Desktop with IBM base functionality	FR-G4X-DBS= and SW-G4BS-xx.x.x=	FR-G4X-DBS= and SW-G45BS-xx.x.x=
IP/IPX to Enterprise	FR-G4X-DA= and SW-G4A-xx.x.x=	FR-G4X-DA= and SW-G45A-xx.x.x=
IP/IPX to Enterprise and APPN	FR-G4X-DA=, FR-G4X-APPN=, and SW-G4AN-xx.x.x=	FR-G4X-DA=, FR-G4X-APPN=, SW-G45AN-xx.x.x=
IP/IPX with IBM base to Desktop with IBM base	FR-G4X-DSBS= and SW-G4BS-xx.x.x=	FR-G4X-DSBS= and SW-G45BS-xx.x.x=
IP/IPX with IBM base to IP/IPX with IBM base functionality and APPN	FR-G4X-APPN= and SW-G4DSN-xx.x.x=	FR-G4X-APPN= and SW-G45DSN-xx.x.x=
IP/IPX with IBM base to Enterprise	FR-G4X-DSA= and SW-G4A-xx.x.x=	FR-G4X-DSA= and SW-G45A-xx.x.x=
IP/IPX with IBM base to Enterprise and APPN	FR-G4X-DSA=, FR-G4X-APPN=, and SW-G4AN-xx.x.x=	FR-G4X-DSA=, FR-G4X-APPN=, and SW-G45AN-xx.x.x=
Desktop to Desktop with IBM base	FR-G4X-BBS= and SW-G4BS-xx.x.x=	FR-G4X-BBS= and SW-G45BS-xx.x.x=
Desktop to Enterprise	FR-G4X-BA= and SW-G4A-xx.x.x=	FR-G4X-BA= and SW-G45A-xx.x.x=
Desktop to Enterprise and APPN	FR-G4X-BA=, FR-G4X-APPN=, and SW-G4AN-xx.x.x=	FR-G4X-BA=, FR-G4X-APPN=, and SW-G45AN-xx.x.x=
Desktop with IBM base to Enterprise	FR-G4X-BSA= and SW-G4A-xx.x.x=	FR-G4X-BSA= and SW-G45A-xx.x.x=
Desktop with IBM base to Enterprise and APPN	FR-G4X-BSA=, FR-G4X-APPN=, and SW-G4AN-xx.x.x=	FR-G4X-BSA=, FR-G4X-APPN=, and SW-G45AN-xx.x.x=

1. For Cisco IOS Release 11.1, 11.0, 10.3, and 10.2 upgrades, substitute the release number for xx.x.x in the product number (for example, SW-G4CS-11.1.1=).

Adding a feature set may require you to purchase additional memory. Table 130 lists the minimum memory requirements for Cisco IOS Release 11.1, 11.0, 10.3, and 10.2 feature sets.

Table 130   Cisco 4000 Series Minimum Memory Requirements for Cisco IOS Software Release 11.1, 11.0, 10.3, and 10.2 Feature Sets

Feature Set	Cisco IOS Release 11.1 and 11.0			Cisco IOS Release 10.3			Cisco IOS Release 10.2		
	Flash Memory	Main DRAM Memory	Shared DRAM Memory	Flash Memory	Main DRAM Memory	Shared DRAM Memory	Flash Memory	Main DRAM Memory	Shared DRAM Memory
Cisco 4000									
IP	4 MB	16 MB	1 MB	4 MB	16 MB	1 MB	4 MB	16 MB	1 MB
IP with IBM base	4 MB	16 MB	1 MB	4 MB	16 MB	1 MB	4 MB	16 MB	1 MB
IP/IPX	4 MB	16 MB	1 MB	4 MB	16 MB	1 MB	4 MB	16 MB	1 MB
IP/IPX with IBM base	4 MB	16 MB	1 MB	4 MB	16 MB	1 MB	4 MB	16 MB	1 MB
IP/IPX with IBM base and APPN	4 MB	16 MB	4 MB	–	–	–	–	–	–
Desktop	4 MB	16 MB	1 MB	4 MB	16 MB	1 MB	4 MB	16 MB	1 MB
Desktop with IBM base	4 MB	16 MB	1 MB	4 MB	16 MB	1 MB	4 MB	16 MB	1 MB
Enterprise	4 MB	16 MB	1 MB	4 MB	16 MB	1 MB	4 MB	16 MB	1 MB
Enterprise and APPN[1]	4 MB	16 MB	4 MB	–	–	–	–	–	–
Cisco 4000-M									
IP	4 MB	8 MB	4 MB	4 MB	8 MB	4 MB	4 MB	8 MB	4 MB
IP with IBM base	4 MB	8 MB	4 MB	4 MB	8 MB	4 MB	4 MB	8 MB	4 MB
IP/IPX	4 MB	8 MB	4 MB	4 MB	8 MB	4 MB	4 MB	8 MB	4 MB
IP/IPX with IBM base	4 MB	8 MB	4 MB	4 MB	8 MB	4 MB	4 MB	8 MB	4 MB
IP/IPX with IBM base and APPN	4 MB	16 MB	4 MB	–	–	–	–	–	–
Desktop	4 MB	8 MB	4 MB	4 MB	8 MB	4 MB	4 MB	8 MB	4 MB
Desktop with IBM base	4 MB	8 MB	4 MB	4 MB	8 MB	4 MB	4 MB	8 MB	4 MB
Enterprise	4 MB	16 MB	4 MB	4 MB	8 MB	4 MB	4 MB	8 MB	4 MB
Enterprise and APPN[1]	4 MB	16 MB	4 MB	–	–	–	–	–	–

Feature Set	Cisco IOS Release 11.1 and 11.0			Cisco IOS Release 10.3			Cisco IOS Release 10.2		
	Flash Memory	Main DRAM Memory	Shared DRAM Memory	Flash Memory	Main DRAM Memory	Shared DRAM Memory	Flash Memory	Main DRAM Memory	Shared DRAM Memory
Cisco 4500									
IP	4 MB	8 MB	4 MB	4 MB	8 MB	4 MB	4 MB	8 MB	4 MB
IP with IBM base	4 MB	32 MB	4 MB	4 MB	32 MB	4 MB	4 MB	8 MB	4 MB
IP/IPX	4 MB	8 MB	4 MB	4 MB	8 MB	4 MB	4 MB	8 MB	4 MB
IP/IPX with IBM base	4 MB	32 MB	4 MB	4 MB	32 MB	4 MB	4 MB	8 MB	4 MB
IP/IPX with IBM base and APPN	4 MB	32 MB	16 MB	–	–	–	–	–	–
Desktop	4 MB	32 MB	4 MB	4 MB	32 MB	4 MB	4 MB	8 MB	4 MB
Desktop with IBM base	4 MB	32 MB	4 MB	4 MB	32 MB	4 MB	4 MB	8 MB	4 MB
Enterprise	4 MB	32 MB	4 MB	4 MB	32 MB	4 MB	4 MB	32 MB	4 MB
Enterprise and APPN[1]	11.0: 4 MB 11.1: 8 MB	32 MB	16 MB	–	–	–	–	–	–
Cisco 4500-M									
IP	4 MB	8 MB	4 MB	4 MB	8 MB	4 MB	4 MB	8 MB	4 MB
IP with IBM base	4 MB	16 MB	4 MB	4 MB	16 MB	4 MB	4 MB	8 MB	4 MB
IP/IPX	4 MB	8 MB	4 MB	4 MB	8 MB	4 MB	4 MB	8 MB	4 MB
IP/IPX with IBM base	4 MB	16 MB	4 MB	4 MB	16 MB	4 MB	4 MB	8 MB	4 MB
IP/IPX with IBM base and APPN	4 MB	16 MB	8 MB	–	–	–	–	–	–
Desktop	4 MB	16 MB	4 MB	4 MB	16 MB	4 MB	4 MB	8 MB	4 MB
Desktop with IBM base	4 MB	16 MB	4 MB	4 MB	16 MB	4 MB	4 MB	8 MB	4 MB
Enterprise	4 MB	16 MB	4 MB	4 MB	16 MB	4 MB	4 MB	16 MB	4 MB
Enterprise and APPN[1]	11.0: 4 MB 11.1: 8 MB	16 MB	8 MB	–	–	–	–	–	–

Feature Set	Cisco IOS Release 11.1 and 11.0			Cisco IOS Release 10.3			Cisco IOS Release 10.2		
	Flash Memory	Main DRAM Memory	Shared DRAM Memory	Flash Memory	Main DRAM Memory	Shared DRAM Memory	Flash Memory	Main DRAM Memory	Shared DRAM Memory
Cisco 4700									
IP	4 MB	16 MB	4 MB	4 MB	16 MB	4 MB	4 MB	16 MB	4 MB
IP with IBM base	4 MB	16 MB	4 MB	4 MB	16 MB	4 MB	4 MB	16 MB	4 MB
IP/IPX	4 MB	16 MB	4 MB	4 MB	16 MB	4 MB	4 MB	16 MB	4 MB
IP/IPX with IBM base	4 MB	16 MB	4 MB	4 MB	16 MB	4 MB	4 MB	16 MB	4 MB
IP/IPX with IBM base and APPN	4 MB	16 MB	8 MB	–	–	–	–	–	–
Desktop	4 MB	16 MB	4 MB	4 MB	16 MB	4 MB	4 MB	16 MB	4 MB
Desktop with IBM base	4 MB	16 MB	4 MB	4 MB	16 MB	4 MB	4 MB	16 MB	4 MB
Enterprise	4 MB	16 MB	4 MB	4 MB	16 MB	4 MB	4 MB	16 MB	4 MB
Enterprise and APPN[1]	11.0: 4 MB 11.1: 8 MB	16 MB	8 MB	–	–	–	–	–	–
Cisco 4700-M									
IP	4 MB	16 MB	4 MB	4 MB	16 MB	4 MB	–	–	–
IP with IBM base	4 MB	16 MB	4 MB	4 MB	16 MB	4 MB	–	–	–
IP/IPX	4 MB	16 MB	4 MB	4 MB	16 MB	4 MB	–	–	–
IP/IPX with IBM base	4 MB	16 MB	4 MB	4 MB	16 MB	4 MB	–	–	–
IP/IPX with IBM base and APPN	4 MB	16 MB	8 MB	–	–	–	–	–	–
Desktop	4 MB	16 MB	4 MB	4 MB	16 MB	4 MB	–	–	–
Desktop with IBM base	4 MB	16 MB	4 MB	4 MB	16 MB	4 MB	–	–	–
Enterprise	4 MB	16 MB	4 MB	4 MB	16 MB	4 MB	–	–	–
Enterprise and APPN[1]	11.0: 4 MB 11.1: 8 MB	16 MB	8 MB	–	–	–	–	–	–

1. Dual bank Flash memory is not supported with the Enterprise and APPN feature set.

Hardware Options

The Cisco 4000 series offers the hardware options listed in Table 131 and Table 132. If a product number ends with an equal sign (=), the item can be ordered only as a spare. If a product number does not end with an equal sign, the item can be ordered as a spare or as a configurable part of a system order.

Note For options that apply to most systems, refer to the chapters "Cables and Transceivers" or "Power Cords" in Part 7.

Table 131   Cisco 4000 Series Hardware Options

Description	Product Number
Network Processor Modules (NPMs)	See Table 121.
Cisco 4000 Memory	
Boot ROM upgrade	BOOT-4000=
Additional 2-MB Flash memory (for a total of 4 MB)	MEM-NP4F=
Additional 12-MB main memory (for a total of 16 MB)	MEM-NP16M=
Additional 4-MB shared memory	MEM-NP4S=
Additional 8-MB Flash memory	MEM-NP8F=
Additional 16-MB Flash memory	MEM-NP16F=
Cisco 4000-M Memory	
Boot ROM upgrade	BOOT-4000=
Additional 4-MB Flash memory (for a total of 8 MB)	MEM-NP8F-M or MEM-NP8F-M=
8-MB upgrade (replaces 4-MB main memory for a total of 8 MB)	MEM-NP8M-M or MEM-NP8M-M=
16-MB upgrade (replaces 4- or 8-MB main memory for a total of 16 MB)	MEM-NP16M-M or MEM-NP16M-M=
32-MB upgrade (replaces 4- or 8-MB main memory for a total of 32 MB)	MEM-NP32M-M or MEM-NP32M-M=
16-MB upgrade (replaces 4-MB shared memory for a total of 16 MB)	MEM-NP16S-M or MEM-NP16S-M=
Cisco 4500 Memory	
Boot ROM upgrade	BOOT-4000=
Additional 4-MB Flash memory (for a total of 8 MB)	MEM-NP8F-P=
32-MB upgrade (replaces 8-MB main memory for a total of 32 MB)	MEM-NP32M-P=
16-MB upgrade (replaces 4-MB shared memory for a total of 16 MB)	MEM-NP16S-P=

Description	Product Number
Cisco 4500-M and Cisco 4700-M Memory	
Boot ROM upgrade	BOOT-4000=
8-MB upgrade (replaces 4-MB Flash memory for a total of 8 MB)	MEM-NP8F-R4-P or MEM-NP8F-R4-P=
16-MB upgrade (replaces 4-MB Flash memory for a total of 16 MB)	MEM-NP16F-R4-P or MEM-NP16F-R4-P=
16-MB upgrade (replace 8-MB main memory for a total of 16 MB)	MEM-NP16M-R4-P or MEM-NP16M-R4-P=
32-MB upgrade (replaces 8- or 16-MB main memory for a total of 32 MB)	MEM-NP32M-P or MEM-NP32M-P=
8-MB upgrade (replaces 4-MB shared memory for a total of 8 MB)	MEM-NP8S-R4-P or MEM-NP8S-R4-P=
16-MB upgrade (replaces 4-MB shared memory for a total of 16 MB)	MEM-NP16S-P or MEM-NP16S-P=
64-M B upgrade main memory for the 4700-M (replaces 8, 16, or 32 MB of main memory for a total of 64 MB)	MEM-NP64M-P=
Kits	
Blank NPM filler card	ACS-NPPN=
Telco/wall-mount kit	ACS-NPWM
19" rack-mount kit	ACS-NPRM

Table 132   Cisco 4000 Series Power Supply Options

Model	Description	Product Number
Cisco 4000-M	AC power supply	CISCO4000-M
Cisco 4000-DC-M	–48 VDC power supply	CISCO4000-DC-M
Cisco 4500-M	AC power supply	CISCO4500-M
Cisco 4500-DC-M	–48 VDC power supply	CISCO4500-DC-M
Cisco 4700-M	AC power supply	CISCO4700-M
Cisco 4700-DC-M	–48 VDC power supply	CISCO4700-DC-M

Table 133 lists the cables you can use with the NPMs. For cable illustrations, refer to the sections "Specifications" and "ATM Cable Specifications" in the chapter "Cables and Transceivers" later in this catalog.

Table 133   Cisco 4000 Series Cables

Description	Product Number
Serial Cables for One-Port Channelized T1/E1/PRI NPM	
MIP-CT1: DSX1 to CSU DB-15 straight-through cable	CAB-7KCT1DB15
MIP-CT1: DSX1 to CSU DB-15 null modem cable	CAB-7KCT1NULL
E1 for 75-ohm, unbalanced connections (with BNC connectors)	CAB-E1-BNC
E1 for 120-ohm, balanced connections (with DB-15 connector)	CAB-E1-DB15
E1 for 120-ohm, balanced connections (with Twinax connector)	CAB-E1-TWINAX
E1 ISDN PRI cable, 10' (3 m)	CAB-E1-PRI

Serial Cables for Two-Port Serial NPM

EIA/TIA-232 male DTE interface, 10' (3 m)	CAB-NP232T
EIA/TIA-232 female DCE interface, 10' (3 m)	CAB-NP232C
EIA/TIA-449 male DTE interface, 10' (3 m)	CAB-NP449T
EIA/TIA-449 female DCE interface, 10' (3 m)	CAB-NP449C
EIA/530 male DTE interface, 10' (3 m)	CAB-NP530
X.21 male DTE interface, 10' (3 m)	CAB-NPX21T
X.21 female DCE interface, 10' (3 m)	CAB-NPX21C
V.35 male DTE interface, 10' (3 m)	CAB-NPV35TV2
V.35 female DCE interface, 10' (3 m)	CAB-NPV35CV2

Serial Cables for Four-Port Serial NPM

EIA/TIA-232 male DTE interface, 10' (3 m)	CAB-232MT
EIA/TIA-232 female DCE interface, 10' (3 m)	CAB-232FC
EIA/TIA-449 male DTE interface, 10' (3 m)	CAB-449MT
EIA/TIA-449 female DCE interface, 10' (3 m)	CAB-449FC
EIA/530 male DTE interface, 10' (3 m)	CAB-530MT
X.21 male DTE interface, 10' (3 m)	CAB-X21MT
X.21 female DCE interface, 10' (3 m)	CAB-X21FC
V.35 male DTE interface, 10' (3 m)	CAB-V35MT
V.35 female DCE interface, 10' (3 m)	CAB-V35FC

Cables for Four-Port E1/G.703 NPM

E1 cable, BNC E1, 75 ohm, unbalanced, 10' (3 m)	CAB-E1-BNC-3M
E1 cable, Twinax 120 ohm, balanced, 10' (3 m)	CAB-E1-TWINAX-3M

ATM Cables

RG-59 coaxial cable with BNC connectors	CAB-ATM-DS3/E3